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GOOGLE INC.

UNITED STATES DISTRICT COURT

NORTHERN DISTRICT OF CALIFORNIA

SAN FRANCISCO DIVISION

ORACLE AMERICA, INC.,

Plaintiff,

v.

GOOGLE INC.,

Defendant.

Case No. 3:10-cv-03561-WHA

DECLARATION OF OWEN ASTRACHAN IN SUPPORT OF DEFENDANT GOOGLE INC.'S MOTION FOR SUMMARY JUDGMENT ON COUNT VIII OF PLAINTIFF ORACLE AMERICA'S AMENDED COMPLAINT

Judge: Hon. William Alsup

Hearing: 2:00 p.m., September 15, 2011

I, Owen Astrachan, declare as follows:

1. I am Professor of the Practice of Computer Science and Director of Undergraduate Studies in the Computer Science Department at Duke University. I earned my AB degree with distinction in Mathematics from Dartmouth College and MAT (Math), MS, and PhD (Computer Science) from Duke University. I submit this declaration in support of Defendant Google Inc.'s Motion for Summary Judgment on Count VIII of Plaintiff Oracle America, Inc.'s Amended Complaint. I make this declaration based on my own personal knowledge. If called as a witness, I could and would testify competently to the matters set forth herein.

2. I have been retained to provide my opinions on certain issues related to the copyright claim in this case.

3. Attached hereto as Exhibit 1 is a true and correct copy of the opening expert report ("Astrachan Opening Report") I prepared in this action, which is a true and correct expression of my opinions based on the facts I currently know (subject to the qualifications noted below, which are due to narrowing by Oracle of its copyright infringement contentions after I signed the Astrachan Opening Report). The Astrachan Opening Report also provides a more detailed description of my qualifications and experience, including a CV which is attached to Exhibit 1 as Exhibit A. Paragraphs 3-5 of the Astrachan Opening Report also provide a more detailed description of the scope of my retention.

4. Attached hereto as Exhibit 2 is a true and correct copy of James Gosling's "The Feel of Java" paper, *Computer*, Vol. 30, Issue 6, June 1997, which I quoted from in paragraph 124 of the Astrachan Opening Report.

5. I signed the Astrachan Opening Report in the evening on Friday, July 29, 2011. I understand that after I had signed the Astrachan Opening Report, Oracle served supplemental responses to certain of Google's interrogatories. I have now reviewed the July 29, 2011 supplemental responses, which were not available to me at the time I signed the Astrachan Opening Report.

6. In preparing the Astrachan Opening Report, I relied on Oracle's interrogatory

responses as they then stood. Prior to its July 29, 2011 supplemental responses, Oracle's interrogatory responses asserted that 48 API packages were at issue (and I have been told that before that, Oracle asserted that 51 API packages were at issue). Oracle's July 29, 2011 supplemental responses assert that 37 (rather than 48 or 51) API packages are at issue. Other than removing some API packages from its copyright infringement contentions, Oracle's July 29, 2011 supplemental responses appear to assert the same bases for alleged similarities as its prior supplemental responses.

7. In light of Oracle's July 29, 2011 narrowing of its copyright infringement contentions, I would qualify the statements in the Opening Astrachan Report in the following ways:

a. In paragraph 21, where I state what API packages I understand to be at issue in this case, I would delete reference to the eleven API packages that Oracle no longer places at issue in this case, namely "java.math" and the ten packages that begin with "java.xml."

b. Similarly, in paragraph 100, the discussion of java.math and java.xml is no longer necessary.

c. In the first sentence of paragraph 102, I would revise downward the three numbers: "In the Android packages at issue, there are ~~472~~*451* public classes, ~~150~~*133* public abstract classes, and ~~176~~*161* public interfaces." (Here, and below, I indicate deletions using ~~strikethrough~~, and additions using *italics*.)

d. The chart in paragraph 110 offers statistics about Oracle's implementation of the APIs at issue. In light of Oracle's narrowing of its copyright contentions, I would make the following revisions to the chart:

Method name	**Number of Times Repeated**	**Functionality?**
toString	~~194~~*184*	Converts an object to a String.
equals	~~157~~*149*	Tests to see if two objects are equal.

hashCode	~~147~~*139*	Creates a "Hash Code" (a numeric representation) of a class.
run	~~139~~*121*	Runs the code in the object.
read	96	Reads (typically to a stream of characters).
write	94	Writes (typically to a stream of characters).
remove	~~88~~*86*	Removes something (exactly what is removed depends on the class).
get	74	Gets the value of an object.
close	72	Closes a stream.
size	68	Returns the number of items in a collection of items.
clear	~~61~~*60*	Clears the content of the thing referenced.
clone	~~59~~*58*	Clones the thing referenced.
TOTAL	~~**124**~~***91201***	**These 10 method names are used by roughly 1/6 of the methods in Oracle's implementation of Java 1.5.**

e. In paragraph 114, I would revise downward three numbers in the following sentence: "In Oracle's implementation of Java 1.5, nearly one-third of the method names at issue (~~2,578~~*2,373* of the ~~7,796~~*7,252* methods) are determined by these rules, including roughly 2,000 that begin with either 'get' or 'set,' and ~~168~~*149* named simply 'equals.'"

f. In paragraph 115, I would revise several numbers: "An additional ~~2,347~~*2,218* method names were single words, like 'run' or 'add.' The remaining ~~2,871~~*2,661* methods are not long or complicated — they are, on average, only ~~2.344~~*2.342* words 'long' (counting a method name like locateURL as two words and findBestMatch as three words). In Android, of the ~~929~~*78693* total methods, ~~3220~~*2961* are unique methods, ~~2676~~*2533* or ~~28.8%~~*29.1%* are one word names, ~~2909~~*2721* are required names (like the 'get' and 'set' examples above), leaving ~~3,712~~*3,439* other methods whose average word length is

~~2.41~~*2.42*."

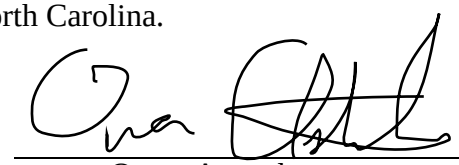
g. In paragraph 141, I would make these two revisions to the following sentence: "The ~~48~~*37* APIs at issue are ~~roughly~~ ~~one-third~~*less than one-quarter* of the Android Runtime Core Libraries, which currently contains 168 API packages."

h. I would revise downwards several numbers in paragraph 143: "Using a Python script SlocCounter.py (attached as Exhibit E) based on the 'sloccount' tool, a commonly-used tool for measuring the size of the source code of large software projects, Android's implementation of the APIs at issue in the 'Gingerbread' release constitutes ~~259,474~~*237,158* lines of code, in ~~1022~~*917* files. This is roughly ~~1.6%~~*1.5%* of the size of the entire Android source code, which comprises 57,076 files and 15,347,169 lines of code,[4] and roughly ~~15%~~*14%* of the 6,340 files and 1,713,087 lines of code[5] in the overall Android (Gingerbread) Runtime Core Libraries. Similarly, implementation of these APIs is a small portion of Oracle's JDK 1.5 implementation of the entire Java API, constituting ~~315,570~~*292,988* lines of code out of 2,867,712 (~~11%~~*10%* of the total) and ~~1001~~*881* files out of 9521 (~~10.5%~~*9.2%*)."

i. Similarly, in paragraph 144 I would say 1.5% instead of 1.6%.

8. None of these qualifications change any of the opinions that I offered in the Opening Astrachan Report.

I declare under penalty of perjury that the foregoing facts are true and correct. Executed on August 1, 2011 in Durham, North Carolina.



Owen Astrachan